REMARKS

Claims 1-12 are pending in the Application. Claims 1-12 stand rejected. Applicants herein amend claims 1, 3, and 5. Support for this amendment can be found in the originally filed claims and at least at page 7, lines 22-23 and page 19, lines 7-20. Applicants submit that no new matter is introduced by this amendment. Accordingly, after entry of this Amendment, claims 1-12 are presented for reconsideration.

Rejection under 35 U.S.C. §102 in view of White

Claims 1 and 2 stand rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,452,713 to White ("White"). Claim 1 relates to a tunable photonic bandgap structure having a plurality of members. We have amended claim 1 to require that "at least one member comprises metal." Additionally, as herein amended claim 1 now recites that the photonic bandgap structure is capable of "controlling electromagnetic radiation from a charged particle beam." For the reasons set forth below, we respectfully traverse the Examiner's rejections over White. In particular, we submit that the reference at least fails to fulfill the requirements of the present claims.

White describes an array of *dielectric* structures. As such, White is not designed for use with a *charged particle beam* as presently claimed. Specifically, using a charged particle beam with the device of White imparts an electric charge to the dielectric structure. This undesirable charging in White's device occurs because of image charges induced in the dielectric material. Charging also results because some portion of the beam will intercept the surrounding dielectric material. The charges induced on White's dielectric material lead to electric fields in the interaction space. In turn, these fields will disrupt beam propagation in White. Thus, using a charged particle beam, as presently claimed, is incompatible with the teachings of White.

Additionally, amended claim 1 now recites a plurality of members wherein "at least one member comprises metal." This amendment emphasizes the advantage of incorporating metallic surfaces near the beam, thereby facilitating beam confinement in the presence of space charge forces. None of these features of amended claim 1 are disclosed or anticipated by White. Therefore, Applicants respectfully submit that claim 1 is allowable over White, and that claim 2 is allowable since it depends from an allowable base claim.

Rejection under 35 U.S.C. §102 in view of Koops *et al.*

Claims 3 and 4 stand rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,973,823 to Koops *et al.* ("Koops"). Claim 3 relates to a temperature-controlled photonic bandgap structure having a plurality of members. For the reasons set forth below, we respectfully traverse the Examiner's rejections over Koops. In particular, we submit that the reference at least fails to fulfill the requirements of the present claims.

Koops describes a tunable filter that is tuned through the action of an electric field. The electric field causes a change in the refractive index. Koops' filtering capabilities change in response to corresponding changes in the refractive index. [Column 3, lines 13-21.] Yet, Koops does not explicitly teach or suggest temperature control of the tunable filter. Indeed, the words "temperature," "heat," and "cool" do not appear in the specification, the claims, or the drawings of Koops.

Indeed, as the Office action states on page 2, *Koops does not mention* temperature control. Furthermore, even if the device of Koops generates heat, Koops does not inherently teach or suggest a method of regulating or controlling the temperature while maintaining the properties of the filter. This follows because although any number of physical and electrical transformations may produce heat as a by-product, it is incorrect to suggest that *indirectly* generating heat is equivalent to *actively* controlling temperature.

Moreover, according to Koops, "[b]y selectively changing the electric field, optical properties ... may be adjusted." [Column 3, lines 34-38.] It is unclear how Koops could regulate the temperature of the device through electric field modifications without sacrificing the optical property that Koops seeks to adjust.

Accordingly, Koops does not explicitly or inherently teach or suggest each and every element of claim 3, in particular "[a] temperature-controlled photonic bandgap structure ... wherein at least one member is temperature controlled." Therefore, Applicants respectfully submit that claim 3 is allowable over Koops, and that claim 4 is allowable since it depends from an allowable base claim.

Rejections under 35 U.S.C. §102 in view of Sievenpiper

Claims 1-3 and 5-7 stand rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,538,621 Sievenpiper *et al.* ("Sievenpiper"). With this amendment, Applicants

herein amend claims 1, 3 and 5 to recite a "mode-selective" photonic bandgap structure. For the reasons set forth below, we respectfully traverse the Examiner's rejections over Sievenpiper. In particular, we submit that the reference at least fails to fulfill the requirements of the present claims.

Sievenpiper describes a tunable impedance surface for steering and/or focusing a radio frequency beam. Specifically, Sievenpiper uses a capacitor arrangement that is connected to a ground plane. However, the structure disclosed by Sievenpiper et al. is incapable of *the mode-selectivity* presently claimed. Using a mode-selective interaction structure requires that the structure remain transmissive to spurious modes while confining the operating mode.

The Sievenpiper structure reflects all frequencies, with varying phase shifts, due to the presence of a metal ground plane. Our claimed photonic bandgap structure is mode-selective. Thus, our structure allows radiation characterized by unwanted frequencies to "leak out" of the structure. Yet, in the claimed mode-selective structure the desired frequency is reflected back due to the photonic bandgap structure. This is a crucial difference over Sievenpiper. The ability of our structure to "leak out" unwanted radiation enables mode-selectivity and spurious mode suppression. Clearly, this cannot be achieved with the groundplane structure of Sievenpiper. Therefore, Applicants submit that Claims 1-3 and 5-7 are allowable over Sievenpiper.

Rejections under 35 U.S.C. §103 in view of Sievenpiper and Murakowski

Claims 8-12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Sievenpiper in view of U.S. Patent No. 6,603,558 to Murakowski *et al.* ("Murakowski"). Although the Examiner relies on Murakowski to provide what Sievenpiper lacks, Applicants respectfully submit that Murakowski does not qualify as prior art.

The effective filing date of Murakowski is July 25, 2001. Applicants claim the benefit of and priority to U.S. provisional patent application serial no. 60/278,131, which was filed on March 23, 2001. Therefore the rejection under 35 U.S.C. §103 is untenable at least because Murakowski is not prior art.

Furthermore, Murakowski does not teach or suggest a vacuum electron device generator for microwave radiation. Instead, Murakowski describes a *micro-ring laser gyroscope cavity.* [See Abstract.] Additionally, as discussed above Sievenpiper fails to teach the mode selectivity

of claims 8-12. Therefore, neither Murakowski nor Sievenpiper alone or in combination teach, suggest, or motivate the limitations of claims 8-12 of the instant application.

Accordingly, Applicants respectfully request reconsideration and withdrawal of this basis of rejection.

Rejections under 35 U.S.C. §103 view of White and Murakowski

Claims 9 and 12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over White in view of Murakowski.

As recited above, Murakowski does not qualify as prior art, and does not teach a vacuum electron device generator for microwave radiation. Therefore, neither Murakowski nor White alone or in combination teach, suggest, or motivate the limitations of claims 9 and 12 of the instant application.

Accordingly, Applicants respectfully request reconsideration and withdrawal of this basis of rejection.

Rejections under 35 U.S.C. §103 in view of Koops and Kim

Claims 8, 11, and 12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Koops in view of U.S. Patent No. 6,535,665 to Kim *et al.* ("Kim").

Applicants respectfully submit that Kim does not teach or suggest a device to generate microwave radiation. In fact, nowhere does Kim discuss microwave radiation or microwave generators. Instead, Kim describes an acousto-optic filter that may include *an acoustic wave generator*. [See Abstract.] The principal of operation of an acoustic wave generator is fundamentally different from a microwave generator. Acoustic waves are longitudinal waves and need a propagation medium, whereas microwaves are transverse waves that do not need a propagation medium. The acoustic wave teachings of Kim are irrelevant and incompatible with the claimed invention. Similarly, Koops is irrelevant in light of the arguments advanced above. Therefore, neither Koops nor Kim alone or in combination teach, suggest, or motivate the limitations of claims 8, 11, and 12 of the instant application.

Accordingly, Applicants respectfully request reconsideration and withdrawal of this basis of rejection

Rejections under 35 U.S.C. §103 in view of White and Kim

Claims 9 and 12 stand rejected under 35 U.S.C. 103(a) as being unpatentable over White in view of Kim.

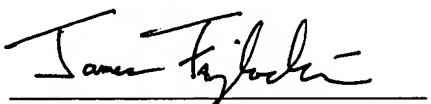
As recited above, Kim does not teach a vacuum electron device generator for microwave radiation, but only relates to acoustic wave generation. Additionally, White is irrelevant in light of the arguments advanced above. Therefore, neither Kim nor White alone or in combination teach, suggest, or motivate the limitations of claims 9 and 12 of the instant application.

Accordingly, Applicants respectfully request reconsideration and withdrawal of this basis of rejection.

CONCLUSION

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of all grounds of rejection, and allowance of claims 1-12 in due course. Applicants also request that the Examiner consider the Supplemental Information Disclosure Statement that was mailed on November 21, 2003. The Examiner is invited to contact Applicants' undersigned representative by telephone at the number listed below to discuss any outstanding issues.

Respectfully submitted,



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Reg. No. 54,089

James E. Fajkowski
Attorney for Applicants
Testa, Hurwitz, & Thibeault, LLP
125 High Street
Boston, Massachusetts 02110

Tel. No.: (617) 310-8414
Fax No.: (617) 248-7100

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